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AUTHOR Steg, Doreen R.; Schulman, Rosalind
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ABSTRACT

Adaptive behavior is defined as behavior where a system adapts itself to the requirements of the environment, and adapting behavior, where the system changes the environment to suit itself using a variety of tools. A wide variety of possible mixtures of both also becomes evident. The result of economic affluence is viewed as such "adapting behavior" in the demand for goods and services, and dynamic sensory feedback provides an intricate means of regulating motion in relation to the environment. However, these phenomena of human behavior, currently evincing themselves in economics and learning cannot be solely restricted to one or two fields. It is postulated that they apply to all facets of human transaction (economic, educational, ethical, psychological, cultural, social, and political) in all material-reward-oriented societies when each society has attained a modest but adequate standard of living for the majority of its population. (Author/CJ)

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TOWARDS A MODEST EMPIRICISM IN HUMAN TRANSACTION

Derived From

A GENERAL THEORY OF ADAPTING BEHAVIOR [15, 16]

Conference:

"Communication and Control in Social Systems"

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D. R. Steg
R. Schulman

Drexel University
Philadelphia, Pennsylvania

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ABSTRACT

Steg has defined adaptive behavior as behavior where a system adapts itself to the requirements of the environment, and adapting behavior, where the system changes the environment to suit itself using a variety of tools. A wide variety of possible mixtures of both also becomes evident.

Schulman has stated that the result of economic affluence is such "adapting behavior" in the demand for goods and services, and Steg has stated that dynamic sensory feedback provides an intricate means of regulating motion in relation to the environment; while both have stressed the necessity of programs that communicate -- Steg in learning theory and Schulman in economics. However, these phenomena of human behavior, today evincing themselves in economics and learning cannot be solely restricted to one or two fields. It is postulated that they apply to all facets of human transaction (economic, educational, ethical, psychological, cultural, social and political) in all material-reward-oriented societies, when each society has attained a modest but adequate standard of living for the majority of its population.

Interaction or Transaction?

> The Newtonian construction - unexcelled for its efficiency within its sphere - viewed the world as a process of 'simple forces between unalterable particles'...Space and time were treated as the absolute, fixed, or formal framework within which the mechanics proceeded - in other words, they were omitted from the process itself... [i.e. interaction]
>
> Einstein's treatment, arising from new observations and new problems, brought space and time into the investigation as among the events investigated. [i.e. transaction] (1)

A transactional approach is seeing together what has been seen separately and held apart.

Introduction

Since 1953 we have been observing an economic phenomenon for which there was no apparent explanation. That phenomenon was declining price elasticity of demand as measured by income elasticity of consumption. In other words, an ossification of purchasing pattern was spreading through every income class of American, except the poor. Businesses were going bankrupt without apparent cause in the midst of unprecedented prosperity.

By 1963 when accurate data became available [25], it became evident that there had been, over the period, a change in elasticity (the ratio between a difference in expenditure for a particular good and an income change.) Elasticity was declining due to increase in income and education (no other variable proved significant); of the two, education showed the most significant pattern.

It has always been postulated by economic theorists that mean elasticity of consumption declines for goods(2) as income rises. But this time the data showed an even greater decline with an increase in education. This was contrary to all predictions and could not be explained on the basis of any previous postulate, (whether Keynesian, Friedman's permanent income hypothesis, or the

adaptation of the permanent wealth theory; or Duesenberry's previous standard of living hypothesis). When Steg's papers [19 et al.] were finally digested it became evident that they were an explicative formula for this economic behavioral phenomenon. The consumer was "learning" and exhibiting an "adapting behavior" cybernetic mechanism. Only a continuous feedback,(3) (hence cybernetic), explains the human transactions in today's consumption. Unfortunately, it is not only the manufacturers who are unaware of either its existence or meaning.

In a series of papers Steg has treated deviation-counteracting feedback in human behavior, i.e. negative feedback, and suggested that at least two distinctive human behaviors become operative in society with possible mixtures of both. These are adaptive behavior, or behavior where a system adapts itself to the requirements of the environment, and adapting behavior where the system changes the environment to suit itself, using a variety of tools: social, economic, psychological, physical, and even political. [17 et al.]

In the paper on "Communication and Feedback in the Technology of Consumption," [13], Schulman has shown that in a society where discretionary purchases and consumption are available to the majority of the population, the consumer becomes a "least cost" buyer for necessities, and refuses to follow previously established patterns of authority in purchasing discretionary goods. In a free or semi-free market this plays havoc with fashion's dictates; causes individualistic consumer reaction in the marketplace - to the point of purchase refusal if desires are not met; and expresses itself in overt criticism, lobbying and myriad other group and non-group activities to influence the market and the manufacturers, economically, politically, and socially.

In other words, the consumer is exhibiting an "adapting behavior" pattern, which will increase in intensity as the society becomes more affluent.

Behavior: Adaptive versus Adapting

Adaptive

Automatic activity of man, animal or machine is an adaptive control system, by its very nature. It is safe to assume that, as with the laws of physics, the laws governing control systems apply equally to animal man or machine. In the language of the system engineer, this is a closed-loop control system. The control system pattern consists of (1) an input signal that triggers some action, (2) a feedback signal of the result of this action to compare with the input signal, (3) a closing of the loop and a summation of the two signals and (4) effective action to counteract this summating signal. A persistent residuary signal can be made to affect memory which results in "learning". In a control system, work is triggered as a result of an actual error input.(4) The error is essential to the activity of any control system. These mechanical patterns apply equally to automatic machinery, animal behavior, and man's everyday automatic activity.

Adapting

An important deviation from the automatic pattern occurs when the automaticity of a system is eliminated. Non-automatic activity will not necessarily be subject to the adaptive nature of the control system and trigger its energy to cancel the disturbance.

With the automaticity eliminated the response to a disturbance is chosen after the disturbance has been analyzed as to its source, the energy involved in the disturbance, the possible response and resulting consequences, including analysis and assessment of energy sources and energy balances. In other words, understanding is replacing automatic response.

To recapitulate, an adaptive control system is subject to the effect of the environment on its sensing elements and has no freedom to control the effect of the environment on its sensing elements. It can only adapt the system by using its own energy to satisfy the requirement from the environment conveyed through the sensors.

Opposed to this automaticity is the human ability of adapting an environment by means that extend human reach in a specific fashion, including in the process the use of tools, machines, and psychological, socio-political, economic, educational and other instruments. Specifically, the human mechanism directs the signal-triggered action with a view to the adaptation of the environment to eliminate the differential between the fed-back signal resulting from the modified environment and the original input signal. The mechanism involved in the latter system or disturbance is subject to the "filter" of intelligence, thus creating an "art image" of the environment to serve as a blueprint for the adapting process. [23] The system involved in specifically human activity is operable only when an action is triggered to adapt the existing, "given", "objective" environment to an "art" or "dream image."

Adapting Behavior of the Consumer in Economic Life

At a point of economic affluence in any society (where a large majority of the population is living at a level considered by its culture to be "modest but adequate," and has major discretionary purchasing power in terms of whatever costs are being considered within the parameters of the culture), consumers of goods and services begin to exhibit patterns of "adapting behavior." These patterns are quantifiable and measurable in terms of price and elasticity of demand ($\sum_{Q}^{P}$) and income elasticity of consumption ($\sum_{C}^{Y}$), both over time and at specific single periods of time, for specific characteristics of both goods and prices. [13]

The data show that consumer demand becomes inelastic as income and education increase, even for discretionary purchases; and that the substitution effect thus becomes a more important part of the change in purchasing patterns than the income effect. The substitution effect causes the buyer to follow a "least-cost" pattern of purchase, whatever the important component of cost may be for the individual - money, time or convenience. Declining elasticity causes a more rigid purchasing pattern on the one hand (I want what I want, when I want it), and on the other a more flexible willingness to switch from one good to another (when the two goods have almost identical characteristics) on the basis of price in terms of money, time, or convenience. It also shows that the consumer has learned to say "No."

Consumers purchase bundles of "characteristics" 7, 8, 9 and not individual goods and services. Demand loses elasticity for many characteristics with rising income and education (no other variables proving significant). This loss of elasticity and consequent increase in the importance of the least-cost (substitution) effect extends to almost all characteristics and costs with the exception of those falling within the "responsive" and "adapting" behavior patterns where the human system changes the environment to suit itself.

As economic affluence increases, the effects of inelasticity of demand become evident in all material-reward oriented cultures, no matter what their political, economic or social systems. When a dictatorial society decides not to make desired consumer goods available - the most profitable industry in such a society will be underground, outside-the-law or smuggling oriented.

It is extremely important to relate the Lancastrian concepts of "bundles of characteristics" with declining price elasticity of demand. First of all, just as there are "bundles of characteristics" there are various types of prices. There are money prices, time prices (the amount of hours spent in any transaction), convenience prices (the amount of effort required for any transaction), and almost any other type of price which a consumer is normally willing to pay. What confuses the average non-economically oriented individual is that a price may also be a good in itself, as a commodity or characteristic. For example, just as we pay in money, when we borrow money, we pay a price for money. Just as we pay in time, when we use a time saving device, we are paying a price for time. Just as we may pay in convenience or effort, when we use a particular salesperson in a particular store, we may be paying a price for saving convenience or effort.

It is an economic axiom that although a particular consumer demand for a particular commodity is completely satiable, the totality of all consumer demands for all commodities is insatiable. This same axiom is applicable to characteristics and to prices. At the present stage of American society the desire of people to save money may be much less important than the desire of people to save time. This is particularly true as more women with families enter the labor force. It is even more true of the white collar than the blue collar worker, and the preponderance of our labor force today is white collar workers and has been so for over the past twenty years.

It is therefore incumbent upon the economist in any discussion of adapting behavior to understand clearly the differentiation between money elasticity of demand, time elasticity of demand, and convenience elasticity of demand. These may and do differ by income group, by education and by extent of participation of the family within the labor force. The perfect example of this type of differentiation can be obtained from a new commodity appearing on the market within the past three years which was specifically tailored for the working wife and mother and which has had a phenomenal success in a field where the hope of new demand or increasing elasticity of demand was almost forgotten - food. The introduction of the differentiated meal by Birds-Eye in the form of different combinations of vegetables took the market by storm. It is interesting to note that price-wise, compared to the normal frozen vegetable, the Birds-Eye Hawaiian vegetables, the Birds-Eye Italian vegetables, the Birds-Eye French vegetables, etc. started as being almost double or triple in price. Nevertheless these vegetables not only sold but sold out.

What was happening could only be analyzed on the basis of the characteristics which the consumer was purchasing. The consumer's price demand, that is, the consumer's value for money per se, was virtually inelastic in a working woman, but the consumer's demand for convenience and for time saving had almost infinite elasticity and the woman was willing to pay the price. When actual nutritional surveys were done of the contents of these packages plus the amount of time required to prepare both from scratch and from prepared foods it was found that the time savings approached anyplace between 40 minutes and 1 hour and 8 minutes in the preparation of these particular conbinations. Therefore the woman purchasing these vegetables and the family using them was paying for

convenience and for time, not for the contents of the package. In figuring the time at the minimal rate for household help of $2.00 per hour it was figured that the price per portion was something like 60¢ less, including the ingredients, than when these particular combinations had to be prepared at home. For the family where both adults are working the money elasticity is extremely inelastic, time elasticity is very inelastic, but the need for convenience becomes extremely elastic and the greater the amount of convenience given by whatever good it is per portion or item, the higher the price in money and in many cases in time the consumer will be willing to pay.

Today, Birds-Eye is going into the preparation of entire meals in the same fashion: where money price is high, time price is very low and convenience price is practically near zero. Recipes are given out with every package showing how meals may be prepared in less than five minutes. Since the value of the money as money is much lower than the value of the time and effort saved, the price charged can be higher. Therefore simple projections of elasticity of demand on the basis of percentage of income change spent on a particular good drops in importance. What becomes all important is what price is being paid for what characteristic.

The only price and characteristic in which consumers will have elastic demand in the future as we become more and more of an upper middle income society (by the year 2020 it has been estimated that approximately less than 7% of our total population will be living in the poverty or near poverty brackets) will be convenience and variety. Demand in total is becoming inelastic in terms of money, inelastic in price of time, but elastic in convenience and effort price and elastic for variety.

Unfortunately the data are not presently available except in isolated cases (such as the food mentioned above) to enable us to do a true characteristic-differential price analysis of elasticity for all goods. However new phenomena are arising, reported in the financial news, magazines, and in other public media which gave rise to the speculation that as far as income is concerned the 1971-72 data will show almost total inelasticity for practically every commodity with the exception of services (included in services of course are such items as medical care, recreation, both participatory and non-participatory, and travel).

This does not mean that in terms of another kind of price than money demand will not be elastic. It will, but the difficulty is that we presently do not have the data, although we have the techniques for estimating the particular convenience price elasticity for something other than an item like Birds-Eye Hawaiian vegetables.

Another perfect example of a low money elasticity of demand concurrently operating with a high variety of elasticity of demand exists in so called cable or pay television. In this case the consumer does not mind paying the money because his money elasticity of demand is so low that the money charged can be rather expensive - but the variety price is extremely low or the price he is paying for variety in that he can see what he wants when he wants it.

Adapting Behavior: Thinking and Education

In an adapting control system, the response to an input signal is not necessarily in a specified relationship to the input. This is because of differential individual perception and valuation. Perception and understanding are shown by empirical data to be altered by education.

In 1960-61, for education of head of household of eight years or less, $\sum_{C}^{Y}$ for "gifts and contributions" reaches an inflection point (5) at income of about $10,000; for head of household having graduated college, the inflection point is reached at income from $5,000 to $6,000. (The relationship of "gifts and contributions" to income is inelastic until the inflection point is reached and elastic thereafter). Similarly, the inflection point for $\sum_{C}^{Y}$ for "medical care" is reached at $5,000 in 1960-61 income for households having non-grade school-graduate heads; but at $2,000 for households with college graduate heads.(6) [11]

Although other consumption patterns are differentiated by education, the two cited above are important because the first ("gifts and contributions") is an example of a feeling of social responsibility existing at lower income levels for highly educated families - to be specific at roughly half the income level of low-education families; and the second ("medical care") is an example of appreciation of the necessity for preventive medical advice occurring again at a lower income level for the more highly educated family. When the income elasticity of consumption ($\sum_{C}^{Y}$) is greater than 1, or elastic, it specifically means that as family income rises, an increased proportion of such income increase is spent on the good or service. Thus, a college-graduate-headed family, with an increase

in income from a mean of $5,500 to a mean of $6,750, will increase its charitable contributions by more than double its percentage income rise, and the same is true of medical care expenditures.

The input signal is identical for both groups of families - an increase in income; but the response by each group is not a function of the signal above, it is a function of the signal and the educational level of the family. Incidentally, for both goods and services studied, the response at each income level is not a function of race.

We have thus a model of thinking which contains quality as an essential element and operates pragmatically as a closed self-organizing loop. It accounts for teleological processes like problem solving, "planning", and mechanistic behavior. It allows for an infinite variety of awareness-cognition-response feedback systems.

As defined by Dewey, art is "to select what is significant and to reject by the very same impulse what is irrelevant and thereby compressing and intensifying the significant." (6) We should add to the statement that both the "significant" and the "irrelevant" are dynamic concepts that continuously change position. Because machines have only automatic, adaptive responses, and thus have built-in "significant aspects", "creativity" is impossible.

Education (formal and/or informal) is the phenomenon which initiates a control activity, triggered by the element of relation, association or construction that appears, for example, when an artist produces an image unlike the one achieved by a camera. It also appears in all scientific discovery, as a change from the accepted previous concept. In other words, education centers on the "art" created image and its involvement in control system activity.

Adapting behavior depends on education andnot training alone. Training involves learning some specified pattern of behavior, be it prestidigitation or tightrope walking, while education is new concept formation. The result of education is creativity, while the result of training is performance involving skill.

If the adapting control process "filters" disturbances or input signals in the closed-loop servo-system which controls human action, education is then taking place.

The servo-mechanism of the human control system continuously develops and grows as thinking develops and grows. Inquiry and correlation of experience are tools used in this process of education; they are elements which trigger the controls. As for experience itself, we can no more know what a particular "experience" will do to education than what a "pencil" will write. Experience, of course, is a pre-requisite, just as one needs a pencil or something to write with.

Any realization of something being wrong is a discovery. It contradicts the previously assumed satisfactory order. Anything that has been logical up to this point becomes illogical, becomes wrong, becomes an error, and will make room for the elimination of error -- for a new logic-- for the "ought" instead of the "is". This realization that something is wrong (which initiates the process) is a prerequisite required for new concept formation. There is a difference between man and animal or man and machine which is made to simulate man's behavior. The computer essentially accomplishes its function by operating on a multitude of types of problems with techniques for solving them. Thus, a problem fed into the computer in a sense triggers the answer that was originally

built into it. But, to reiterate, human problem solving is a matter of education and growth. It creates or formulates problems and at times their solutions.

Adapting Behavior and Learning

Learning in education is the possibility of going outside of a frame of activity. The difference between man and animal or machine is specifically that a machine that has "automatic" activity has, of course, been programmed to so act. It can automatically perform activities which it was designed to perform. An animal or man can also be programmed, i.e., the responses are limited to the programming or designing, just as in behavioral terms, persons automatically respond as experience, reinforcement or "programming" has determined that they shall. The responses are the result of training. Brainwashed man is as programmed as a machine. The learning in this case is programmed, hence automatic. But it is questionable whether one can train all men. The possibility of training may be inversely related to the distance the individual has progressed from the animal state.

Similarly, what is happening in the marketplace is the development of a responsive environment for consumers with increasingly adapting behavior patterns. Those markets that are not responsive (in its cybernetic sense) environments are going bankrupt.

A system is an organized whole of parts. Hence: $\sum_{i=1}^{N} E_i$ is a system. However, is the system the same if E_2 comes first and E_1 comes second? The answer is no.

Just as in a responsive environment, learning occurs when the individual controls and influences his environment. [20, 21, 24]

Similarly, the environment, not only a learning environment but the total environment, must be made responsive to the individual's actions. It may be that we have now reached the stage, wherein, when an individual gets the time to learn in an environment responsive to his desires [8] he may now begin to think he can influence his environment, and attempt to influence society to give him what he wants. Patterns of consumption acquired in consumer behavior seem to indicate this. Note the meat boycotts, rise of indigenous buying groups, refusal to accept authority, changes in purchases of clothing, furniture, cars and the rise of the consumer veto.

Once choice is present, once options are available, the environment must become responsive to the individual's desires (note, needs are necessities and inelastically demanded, wants and desires are elastically demanded) for the environment to survive. In this case, however, the environment is the usable environment, in the sense of goods and services, and in political, moral and/or social behavior, or education. Furthermore, an individual's gain need not entail another's loss. We are faced here with non-zero sum games. Adapting behavior on the part of an individual implies maturity and non-degradation of the environment.

To create a properly functioning social entity that is active in animal husbandry, agricultural pursuits and other activities under the adapting control system (adapting the environment instead of being adapted to it) a system of communication is required in which understanding, as an element of an adapting control system, plays a major role. The communication system suitable for an adapting process requires means of communicating elements leading to understanding. A characteristic specific to an adapting system is a type of communication, the nature of which goes beyond

transmittal of information. It involves an element of possible reaction to the signal on the part of the receiver that permits understanding of this reaction by the originator of the communication. This particular phenomenom implies a closed loop communication.

In addition, it is an adapting communication system in its own right. Thus the early establishment of the U.S. Agricultural Experiment Station was sited within a radius of a single day's travel there and back for the average farmer in the vicinity. As modes of transportation became capable of encompassing longer distances, the Stations could move further apart; but the necessity for communication was the main determinant of the time-distance.

In the same fashion, industrial and technical research has always tended to cluster about centers permitting constant interaction and communication between individuals. "Science centers" have always existed since the temples of Mesopotamia and Egypt. Knowledge and invention cannot be pursued in a vacuum.

Adapting Behavior and Ethics

There is a further phenomenon that arises when the individual subjugates the environment rather than developing understanding and control. The meaning of the word "rule" as used herein is to describe a hypothetical relationship of cause and effect as applied to behavior in a control system. It implies a mathematical formula relationship as an end product. Thus, the law or rule of gravity translated into a mathematical equation by Newton used the word gravity in describing a phenomenon, the nature of which was, and still is, a mystery.

When we use the word "ethic" we are discussing an interrelationship. When we use the word "rule", we are describing a causal relationship. Anthropomorphically, a rule was a causal relationship derived from the "Lord."

But this is not our concept of ethics.

Communication in an adapting system of man-man stands for a relationship between man and man as described by the term "Ethics", and comprises a special condition that implies mutual understanding, awareness, consciousness and reasoning, in contrast with a relationship lacking these ingredients.

We have distinguished between an adaptive system, which is a self-organizing system, and an adapting system, where there is organizing control, requiring consciousness. Consciousness is the acquired characteristic of an adapting control. Thus, training is not sufficient nor satisfactory for moral behavior.

As previously noted, communication in an adapting control system relates to a relationship between man and man and comprises a special condition that implies mutual understanding, awareness, consciousness and reasoning. This characteristic is acquired by each new generation from the previous one by means of the educational process. Thus, the educational process has a prerequisite, mutual understanding.

The social form of government under an oligarchy, ruling according to rules of slavery or domination of any sort, is the expression of undeveloped understanding by the few in their effort at using the adapting controls to tame the many. Slavery is the expression of the system of adapting controls characteristic of man, but paradoxically enough, so is freedom from slavery.

To put the above in technical control language would sound something like the following: Moral rules contain the desired quiescent state of a system. This implies that control action does not take place when the moral rules conditions are satisfied. The reaction of the system when the moral rules are not satisfied can thus be considered of two kinds:

1. To satisfy the requirement of a moral rule.
2. To eliminate the requirement for a moral rule.

When control is vested in an oligarchy, the moral rules to satisfy that oligarchy are to be found in category 1. The reluctance of human nature to follow such rules falls in category 2. Control of the adapting type is required in order to eliminate this conflict between the oligarchy and the reluctance of people to follow.

Free social forms are only possible with the overwhelming majority understanding the nature of the adapting control system of man.(9) This makes equal opportunity, voluntary cooperation and competition for all a satisfactory social environment. Communication in such a system establishes a relationship between man and man as described by the term ethics and consists of decisions concerning continuous choices. Education for ethical behavior is education for choices to be continuously made.

Control Systems versus Reinforcement Control

It has been observed experimentally that providing knowledge of results, rather than reducing or withholding knowledge, does lead to more effective learning. Immediate knowledge is more effective than delayed knowledge, but it will not automatically enhance efficiency of performance and learning. Yet, it is generally assumed that learning can be enhanced if it is followed by reinforcement.

Dynamic sensory feedback provides an intrinsic means of regulating motion in relation to the environment, while knowledge of results, given after a response, is a static after-effect which may give information about accuracy, but does not give dynamic regulating stimuli. Dynamic feedback indication of "error" would thus be expected to be more effective in performance and learning than static knowledge of results.

Furthermore, the efficacy of reinforcement assumes an active need or drive state, while feedback theory assumes that the organism is built as an action system and thus energizes itself. Hence, body needs and wants are satisfied by behavior that is structured primarily according to perceptual organizational mechanisms, and require programs that communicate. We can now judge why reinforcement of a child turning his head to the right, being reinforced by a sucrose solution sucked from a bottle, takes hundreds of tries, and Bruner's baby with the $20,000 pacifier takes only a few tries, about five seconds, before he learns to focus a picture of his mother, and he isn't even hungry.(10) The bottle experiment is a stimulus-response model, while the pacifier experiment is a true cybernetic feedback model.

Pacifier Experiment (Cybernetic Control Model)	Bottle Experiment (Stimulus-Response Model)
. No physiological deprivation	. Physiological deprivation
. No hunger	. Hunger
. Free movement	. Swaddled
. Closed loop	. Open loop
. Internal control	. External control
. Voluntary control	. Stimulus control
. Intrinsic means of regulating motion	. Extrinsic reinforcement schedule
. Means and ends not bonded	. Means and ends are bonded
. Systematic relation to the learned behavior	. No systematic relation to the learned behavior
. Learning requires no reinforcement	. If learning occurs, it is transient, requiring reinforcement
. Behavior is the control of input	. Behavior is the control of output
. Dynamic continuous feedback	. Static after effect of knowledge
. Few trials for learning	. Many trials for learning
. Self-determined learning	. Doubtful feasibility of conditioning
. Primitive adapting system	. System adaptive only if and when successfully engaged

To summarize; Use of linear programs (including branching) in all teaching deliberately limits the media of communication, the experiences of the student and thus the depth of understanding that he achieves.

Instead the student should be provided with a broad context of experience by resorting to all of the activities and to all of the communicative media at our disposal. This includes verbal and non-verbal material. Thus, the student learns by responding to the perceptual organization of his environment.

Beyond deviation-counteracting feedback or negative feedback, there is also operative a deviation-amplifying parameter, or positive feedback. [24]

The world of advertising media in our present 'free society' has been geared to the development of reinforcement stimulus-response models and not cybernetic control, because the media has usually assumed adaptive behavior on the part of the consumer. By assuming that the consumer is an adaptive personality and therefore learns what is being taught without wanting to use the learning as a means of further expression, the media in advertising have assumed that constant repetition would cause the consumer to learn, without thinking either of the repetitive method or of the application. Reinforcement control without obtaining consumer reaction (other than in the most general fashion of like or dislike, I or nul-I, percentage listening versus percentage not listening, percentage tuned in versus percentage not tuned in, and the entire world of Neilsen Ratings) is solely for an adaptive behavior society.

Cybernetic control on the other hand, assumes that the response of the media to the needs of the consumer dictates the type of approach to the consumer and that this approach is changeable as the consumer responses are obtained. The chart showing the differentiation between reinforcement and cybernetic control has been given above.

If consumer response to product differentiation can be looked at as a form of adapting behavior (inelastically demanded product for which according to empirical evidence and theory the substitution effect of least cost is greater than the income effect) no manner of reinforcement control can influence the buying of that good which is cheapest in time, money or convenience. As some of our manufacturers have found to their sorrow (the latest bankruptcy in men's clothing being century-old Botany Industries),no amount of reinforcement control could possibly influence an adapting society, which is exactly what happened.

For the first time in the early nineteen-sixties, President John F. Kennedy sent a message to Congress on Consumer Rights:

1. The Right to Safety - To be protected against the marketing of goods which are hazardous to health and life.
2. The Right to be Informed - To be protected against fraudulent, deceitful or grossly misleading information, advertising, labeling or other practices, and to be given the facts needed to make an informed choice.
3. The Right to Choose - To be assured, wherever possible, access to a variety of products and services at competitive prices; and, in those industries where government regulations are substituted, an assurance of satisfactory quality and service at fair prices.
4. The Right to be Heard - To be assured that consumer interests will receive full and sympathetic consideration in the formulation of government policy and fair expeditious treatment in its administrative tribunals.(11)

It should be noted that of these four Consumer Rights first mentioned in John Kennedy's message, three are solely for an adapting behavior society: the right to be informed, the right to choose, and the right to be heard, which are of course the basis of cybernetic control or feedback.

Interestingly enough it has been increasingly proven by a number of empirical studies that those advertisements giving accurate information have been and are much more effective than "puffery" as it is known in advertising circles. For the first time in history during the decade of the latter part of the 1960's until the present day, manufacturer after manufacturer has been forced to establish a consumer department or a complaint department which is a direct form of industrial "ombudsman" ready to give information and service to the consumer. Word of mouth campaigns in today's society are having much more influence than the greatest dollar amount of Madison Avenue shellac. Many manufacturers have found that such consumer activities as hiring billboards to express dissatisfaction with product, using sky advertising to advertise defects, increased use of the courts for suing for defective product, and increased bombardment of consumer complaints has forced them into increasing quality control and in some cases to total redesign.

The increased number of subscriptions and memberships in Consumer's Union and other impartial product evaluation organizations within the past five years has caught manufacturers by surprise. Sears Roebuck after its first introduction has never readvertized "Tuffie" jeans, because every time they come into the store they are sold out (after the CU report that they outlasted regular jeans by a factor of three times normal wear). The consumer response

to the gasoline and oil crisis is another example of adapting behavior - and the slowness of consumer desire to invest in new automobiles after this crises has completely confounded the manufacturers - no matter what the advertising says.

Adapting Behavior and Societal Development

While there have been numerous studies that have attempted to integrate the negation of material or cognitive reward by the substitution of conditioning, only a material-reward approach can be successfully projected. If deviation-amplification sets in, cognitive development occurs. What appears to follow is social and affective development. [20, 21, 24]

At this time it must be maintained that the individual in a materially oriented society that has not attained the "modest but adequate" pattern of living of that society in an economic sense is adaptive. As the individual becomes less financially restricted (more and more able to obtain the "normal" accepted level of material life), behavior becomes adapting. In other words, he can use ever greater economic, political or social leeway to change his environment.

Thus, Florence prior to the Renaissance was the richest country (in terms of time and access) in Italy because it was the one area with sufficient food (which in the Middle Ages was the equivalent of a "modest but adequate" level of material living). Hence, they had discretionary purchase power and from this a positive time correlation with the start of the Renaissance, which was an integrated scientific-cultural-social development within the limitation of the technology of the Middle Ages.

The only two other non-slave based pre-technological societies which attained discretionary purchasing power in terms of their respective cultures

were the Inca society in central America and the land of Israel at the time of Solomon. Although the former society is presently undocumented except from tales of the Spanish conquistadores and ruins, the latter has been aptly described in the Old Testament as the 40 years of fulfillment of the promise of the Lord to Solomon at Gibeon (Chronicles II, 12), "I will give thee riches and wealth, and honour, such as none of the kings have had that have been before thee, neither shall there any after thee have the like," And for 20 years Israel, in a land having perhaps less than 3 million inhabitants, built the Temple, with an equivalent man-year labor expenditure of 20 times 153,600 men.

As demand becomes inelastic, as items become necessities, or individual reaction to cost changes become inflexible, the substitution effect takes over. The black box makes no distinction between equivalent characteristics except for cost to the individual, be it in dollars, time, inconvenience, longevity and so on.

As the United States approaches in the 1970's and 1980's the same relative level of discretionary income as Florence or Solomon's time, we see burgeoning the means to grow from this country an indigenous cultural-technological-sociological expression which may well be the beginning within our own technological ability, of a new integration.

It has only become possible with the work of Kelvin Lancaster to distinguish elasticity of demand for characteristics of goods by components of price in such a way that integrated comparisons of different mores become scientifically feasible. Consequently, for the first time it may be possible to generalize from single country experience on the probability that comparable changes for characteristics (even if goods are non-comparable) occurs in materially oriented countries, no matter what their system of ownership, political power, or social structure. However, we cannot compare patterns in a material and a non-materially oriented culture, (i.e. Zen Buddhism).

In primitive societies, and in societies where non-material rewards operate, the mass of the people are adapted to the requirements of the few that are leading. Material rewards must be of this life at this time and cannot be a credit for the next life or transformation.

As mentioned above, there are material-reward oriented societies where even though scientific development has occurred we still have a majority adapted to the requirements of a minority, but with consequences of inefficiency, bottlenecks, breakdown and resource waste.(12)

In the U.S., the condition of greater interdependence arose with the age of the rail. Today, almost instantaneous communication creates interdependence. Therefore, with a more educated population one gets group dynamic adapting behavior. No matter how small a group (2%, 20% or 90% of the population) each can create as much hell as the other. Interdependence carries over into social action. An individual transacts with the closest individual with whom he is already involved in some capacity, thus leading rather easily into cooperative venture (i.e., students getting together to picket a laundry that ruined John's shirt).

This kind of social interdependence occurs over the entire range of income groups except where the individual is absolutely indigent. It extends from the very top to the very bottom. It changes and is amorphous, since one is dealing with a cybernetic flow, a situation having social feedback, dynamic give and take occurring between people. As understanding replaces automatic response, social transactions develop. The number of possible permutations is infinite! One can never predict people's actions with certainty as people have become accustomed to behaving adaptingly, but the laws of probability permit approximation.

As noted above, art is something no one can teach. One cannot choose what is significant for another. One cannot make a person enhance or distort something in a way that one does not himself know how to distort or enhance. Yet, such oblique or surrealist views and disorderly processes are a necessity for adapting behavior to occur. Furthermore, the selection of the "significant" depends on choice being present, otherwise no selection can occur. All scientific discovery depends on such processes, as a change from the accepted previous concept.

We now postulate that countries such as the USSR and China will not grow unless there is enhancement of adapting behavior. And the U.S. as we know it, will probably continue to change. The present state of the United States is that of an adapting society, rich today and tomorrow, given the technological possibility of unlimited non-polluting power and water within a few generations.

Statistics and informations coming out of the USSR (not given by the official publications) indicate that Russia has been having probably the highest labor turnover in history in the new scientific towns east of the Urals. The new generation graduated from college is assigned to jobs in these areas. In order to make these areas attractive to these workers (mostly white collar scientific and technical personnel) Russia has been allocating to them most of the durable goods available in the country, such as first priority on automobile purchase, television purchase, household appliances such as washers, dryers, etc. The young generation graduating from the schools has signed up for five year contracts in the east Ural technological communities. Once there, they obtain their durable goods and at the end of five years, 60% of them (according to the best available figures) head back to major population areas within the USSR. One thing the Russian government cannot provide for these areas is, obviously, climate. The second is a lack of cultural interchange which is required for personal growth and development. Consequently, the turnover of personnel in these areas is the largest in the Soviet Union no matter what the government can do.

This is not a directed movement. It is absolutely indigenous and occurring without the concurrence of the government, because unless the labor contracts are made for ten years there is nothing the government can do to stop it. The shortage of scientific and technical personnel is such in Russia that pirating is rife and the young people can at the end of their contract obtain jobs which are more attractive in terms of physical and cultural environment.

Since these young scientific and technical workers are the middle class of Russia they are adopting adapting behavior batterns in the meaning of the term used in this paper. As more of the Russian population approaches this degree of affluence it also will adopt adapting behavior patterns. The Russian population is presently forcing the government into production of consumer goods. If this is not adapting behavior, then it has never before been exhibited in the Soviet Union. There is no doubt of the fact that the indirect influence of consumer demand is making itself felt in the Kremlin. How soon it will make itself felt in Peking is a question of how soon the society can become more affluent.

In the U.S. the governmental system has worked more on intra-party accomodation than on inter-party rivalry. If there is an infinitely possible variety of permutations of feedback effects, then there is going to be inter-party accomodation in the future. The effect of division into parties becomes much less important. What emerges is a form of concensus called the pragmatic position. Presently in many questionnaires, checks are asked for the following categories in voting: Democrat, Republican, Leftist, Rightist, Independent, and Pragmatic (votes on issues). The Republican"Turks"band together with the Democratic"Turks"on particular actions and do not gang up on one another, thus getting a shift into permanent tailspin, yielding one party on any particular issue. What is occurring is that the two

party system is disintegrating into a kaleidescope of issue-dominated, shifting time, accomodative groupings. 'A' may agree with 'B' on issue 1 and with 'C' on issue 2, but this does not prevent 'A' from disagreeing with both 'B' and 'C' on issue 3. As stated above, the system also changes according to order as well as quantity in a non-zero sum game.

Since there is no life without order or rule or ethic, what we are developing is a continuous-shift pragmatic grouping society.

Feedback, in the cybernetic sense (as opposed to that feedback which means knowledge of results) occurs not only in economics but in politics, in the family, in life. (Note the emergence of communication as a descriptive and explicative framework in psychiatry.) It is affecting the behavior of an entire population. We now have evidence and measurable data in economics that indicate the presence of this phenomenon in consumer behavior. The presence of this adapting behavior does not mean that it is limited to economics only. Why should it be isolated to this field? It is a phenomenon that is pervasive, be it in education, the psychology of learning, social development, ethical behavior, or political development. Adapting behavior is much more than just adapting economic behavior.

In 1910 pre-World War I United States, there was a small middle class and a large lower class. By 1960, the Newport estates, the yachts and the 27 servants had just about disappeared. The shift occurred in that pre-World War I the majority was adapted to the requirements of the minority. It led to where the minority became adapted to the majority. The shift is still going on and consolidations continue to take place.

At present there are societies that are technologically and scientifically advanced and are still slave societies. (Slavery is defined as control of the individual's ability to work, think, move and establish familial relationships.)

The question arises as to whether in such a society technology and science can be used for or by the slaves. If the slaves are the masters of technology and begin to have discretionary income, time and purchasing power, then agitation will set in. The move towards adapting behavior will occur.

There can also be a technologically advanced society that may not provide a sufficiency of goods for a majority of people. This can also be a master-slave society. But once a group of people, be it slave class or not, has discretionary purchasing power in terms of income or time, they become adapting creatures as exhibited in consumption patterns, where slavery cannot co-exist.

In a technological society where the masters use the technology for the slaves and the slaves "receive" the "good life," there are several problems that become associated:

1. The masters will tire out sooner or later if they do all the work.
2. The masters become the working class. Eventually no one will want to be in it.
3. Such society is similar to a bee hive, or an ant heap where the masters become the workers and the queen and the slaves become the drones. Inbreeding would eventually kill off the masters, if the slaves would not be permitted to mix.

There is evidence that learning in the sense of new concept formation develops with conscious individual growth and assertion. [17, 18, 21, 24] If such learning is not enhanced, education is not taking place and only training is allowed, such society will show no discoveries. At best it will have innovations, but growth will not occur and the society will be static and deteriorate.

For about 7,000 years of recorded history, since Shub Ad of Ur, the vast majority of people have worried about one thing...food. The entire human energy output has been expanded on trying to eat. Today this is still true for the vast majority of the world, for most of the third world, the greater portion of the Middle East, South America and Asia. This is also still the case in some parts of Europe. Only two centuries, 1/14th of the time span, has given us progress to the point where some people stopped starving in some countries. Basic progress has occurred since the time of mass production, during the second to the eighth decades of the 20th century. In the decades since the 1950's the greatest strides ever have been made. We thus have major development in less than 1/10th of the time of recorded history. In the U.S. the discretionary class became a majority after 1964 - less than ten years ago. (We now have evidence that the majority of the blacks have entered the middle class.)[13] The black leadership that led the agitation of the blacks were from the lower upper and upper middle classes. It is thus understandable why this is not the case yet with the Chicanos and the Amerinds (American Indians) and not quite the case with the Puerto Ricans. But that is beginning.

The adapting behavior pattern can best be illustrated by the turnaround in the acceptance of consumer non-durable and durable goods as evidence of the "good life" in American society which occurred with the generation of the 1960 college students. This has had profound effect upon our entire society. We have seen an entire generation conduct a revolution in lifestyle as well as a revolution in dress, in eating habits and patterns, etc. which will probably continue for a long period of time. It is interesting to note that those participating in the lifestyle revolution also have extremely low money elasticities of demand for such goods as they do require, such as hi-fi equipment,

automobiles or bicycles, etc. In other words they do not seem to mind what price they pay as long as they obtain what they want. However, they have an extremely high elasticity of demand for variety for those goods which they want, and are willing to experiment in obtaining those items of dress and living which they consider necessary.

The entire movement towards a demand for a good which does not take time for people to use is another example of adapting behavior. People require durability because they do not want to take the time to shop once they have something. They want it to last. They don't want to have to go out and buy it again. For this they are willing to pay a higher dollar price, but the time price is very low and the convenience price of not having to shop twice becomes zero.

Conclusion

We have found a pattern of adapting behavior where the environment is changed to suit the requirements of the system, as opposed to the system changing to suit the requirements of the environment. This is a true cybernetic activity in response to economic stimuli. Only education is correlated with this pattern of behavior. Not even race is so correlated.

We found adapting behavior or learned behavior, in a situation that is not a learning situation, for instance, in a consumption pattern. This means that that kind of learning can extend through life and exhibits a pattern in which the environment is changed to suit the individual requirements. Severe problems ensue if this is not recognized. For instance, we have had an enormous increase in bankruptcies amidst the most prosperous economy ever in the past 20 years. In advertising, for instance, not all the repetition in the world has an effect on human consumption. Note the radical change in some of today's advertising in an attempt to influence consumption.

Exhibited adapting behavior is evidenced in a cybernetic situation wherein the individual takes choices, relates to information selectively, and refuses to be "brainwashed" or influenced in choosing what he desires. This applies in every political environment, such as the new towns in the USSR. This adapting behavior is exhibited when a particular economic threshhold is reached. The individual quickly exhibits this behavior in educational, social and political areas as well. The economic threshhold is where the majority of the nation becomes middle class, or to put it in economic terms, when the majority have achieved discretionary income.

It is therefore postulated, that all societies which have attained freedom from abject want will eventually approach the point at which affluence in time, goods and/or money will make it necessary for the societies to respond to adapting behavior, a distinctive human transaction. Of necessity this implies technological development. Such patterns of adapting behavior can be pervasive in all human relationships, in every field of endeavor.

FOOTNOTES

1. Dewey and Bentley, 1949, pp. 111-112.

2. It increases for services.

3. As opposed to the "Psychological Abstract" definition of feedback as 'knowledge of results.'

4. The term "error input" is an engineering term commonly accepted to mean a disturbance.

5. Point of slope change.

6. Schulman, 1972, pp. 403-408.

7. Dewey, 1934, p. 208.

8. Princeton experiment with negative income tax.

9. Today there are no free social forms in our society. Just because the majority has the power does not mean that they are using it with understanding.

10. Kalnins and Bruner, pp. 1-19.

11. Magnuson, 1972, pp. 3-4.

12. The largest industry in the Soviet Union is smuggling and other forms of illegal or underground activities including reproduction of banned books, records, etc.

13. Wattenberg and Scammon, pp. 35-44.

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